Revised Sep 1998

# PART 6

# ARCHITECTURAL

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I. DESIGN CONSIDERATIONS:

A. Design Quality: All aspects of the project shall be carefully studied to employ economic and functional architectural design, closely tailored to the requirements of the user. Particular attention shall be directed to the selection of exterior and interior finishes to ensure compliance with the installation Design Guide, and to the type and extent of services required. The intent is to produce a more attractive building, both inside and out, that will be useful, efficient and livable; thus quality architecture will be achieved through functional planning.

B. Manuals: Design guides of military construction requirements for Army are the Architectural and Engineering Instructions (AEI), DA Technical Manuals in the TM 5-800 through TM 5-899 series, and the Department of the Army's Facilities Standardization Programs Standard Design Guides; for Air Force construction, AFM 88-15 and other Air Force publications when made available. Architectural and Engineering Instructions (AEI) from DAEN-ECEA, dated 4 Jul 1994 (and all current changes), are to be used replacing Department of Defense Construction Criteria (DoD 4270.lM) at Army installations. These AEI shall have precedence where conflicts exist with present instructions until such time as present instructions can be rewritten. The following chapters from the AEI manual must be adhered to for all MCA facility design.

1. Chapter 3, Comprehensive Planning and Siting Criteria: Buildings shall be designed and sited to be in harmony with neighboring facilities as required in this chapter.

2. Chapter 5, Buildings and Facilities Criteria: Calculations of building square footage and volume.

3. Chapter 6, Architectural Criteria. The establishment of functional areas and finishes. Where criteria is not available, accepted design and industry standards and practice will prevail.

4. Chapter 7, Provisions for Physically Handicapped Individuals: Features for handicapped use will be incorporated into the design. For all new construction and substantial alteration projects, a certification will be furnished stating that the project has met the requirements of the manual or if access to the handicapped was not included, the specific reasons why it was not furnished.

5. Chapter 9, Fire Protection Criteria: Fire protection including type of construction, allowable egress, and sprinklers shall be coordinated with requirements as outlined in NFPA STD 101.

6. Chapter 11, Energy Conservation Criteria: Energy -Design criteria for temperature limits, "U”-values, natural light and ventilation will be used to insure conservation of critical fuels and energy resources. Technical Manuals provide guidance on specific design related issues. Examples are TM 5-803-5, Installation Design and TM 5-807-10, Signage. If guidance in these manuals is followed it should minimize problems where the design does not meet DOD standards. See Appendix B for a current list. Design Guides are available for a select number of facilities. Functional planning criteria, space requirements, equipment, etc. are outlined in these guides. Previous design experience is drawn upon to guide the designer to a well-designed facility within Army criteria (see appendix B). Army Regulations (AR), Engineering Pamphlets (EP), Engineering Technical Letters (ETL), and other DOD and *DA regulations may be necessary to provide for facility specific requirements.

C. OSHA - Requirements for protection for employees as outlined by current OSHA Standards shall be considered.

D. Corps of Engineers Guide Specifications (CEGS) are intended to promote uniformity of construction by providing requirements that have been coordinated with industry. The latest guide specs will be provided by the project manager.

II. DESIGN STAGES AND SUBMITTAL OUTLINES:

A. Complete design submittals are required at completion of established project stages that shall include the Concept, and Final design phases as a minimum for all projects. Design and technical reviews shall be performed at concept and final completion. There shall also be a back-check review at design completion in order to verify that all comments made during final review stage have been addressed. In addition, some projects will require a submittal at Pre-concept and Preliminary design phases. Complete submittals will help reviewers understand the design and related details. Submittals shall include, but not be limited to, the following:

1. PRE-CONCEPT (if applicable):

a. Design analysis.

b. Code and Fire Protection Plans, as part of design study.

c. Schematic designs of alternatives (usually three separate design schemes.)

2. CONCEPT:

a. Design analysis.

b. Preliminary Working drawings (Plans, elevations, section, wall section.)

c. Interior design space planing and furniture layouts and equipment layouts as applicable.

d. Fire Protection Plans, as part of construction documents.

e. Specification outline (to include interior design-related items.)

f. Cost estimate.

g. Responses to any schematic review comments. Responses itemized with comments.

3. PRELIMINARY (if applicable):

a. Design analysis.

b. Complete set of Working Drawings.

c. Interior design furniture and equipment layouts and color schemes.

d. Fire Protection Plans, as part of construction documents.

e. Specification outline (to include interior design-related items.)

f. Cost estimate.

g. Response to all review comments. Responses itemized with comments.

4. FINAL:

a. Design analysis.

b. Perspective drawing cover sheet.

c. Completed set of Working drawings. Shall include necessary plans, elevations, sections, schedules, including interior design layouts, elevations, materials and color boards.

d. Fire Protection Plans, as part of construction documents.

e. "Marked-up" Guide Specifications.

f. Cost estimate.

g. Responses to all review comments. Response itemized with comments.

5. BACKCHECK:

a. Design analysis.

b. Working drawings completed as construction documents. (Fire Protection Plans to be included.)

c. Typed specifications completed as needed for contract documents.

d. Cost estimate.

e. Responses to all review comments. Response itemized with comments.

III. REFERENCED CRITERIA FOR DESIGN STAGES:

A. The following information is referenced from ER 1110-345-710, Engineering and Design, DRAWINGS, and is provided to give the designer an overview of the Concept and Final design phases.

1. Concept Design Drawings: Concept designs are used to define the functional, technical and engineering aspects of the project, and to help verify project costs in order to provide a firm basis on which to initiate final project design. Completion of concept design drawings, together with a design analysis, outline specifications and cost estimate, normally represents about one-third of the total design effort. Concept designs will be prepared in accordance with AR 415-20 utilizing the project requirement documents and applicable standard drawings. When standard design drawings are used, the drawings for the new project will include appropriate sheets from those drawings modified to show site adaptations and other essential requirements. Duplication will be avoided except as required for clarity. Concept design drawings shall include the following information:

a. Project site plan showing existing and proposed buildings, roads, parking, plant masses, contours, and utilities in the immediate project vicinity.

b. Building floor plans, sections, and elevations showing functional layout, space configuration and form, and building system characteristics including required properties and/or performance of the construction materials and methods. Projects incorporating PREWIRED workstations shall provide Interior Design space planing and furniture layouts with space programming solutions.

c. Design details of exterior and interior elements, schedule of finishes and colors, and details related to architectural, structural, mechanical and electrical systems, fire safety, energy usage, and other special requirements.

d. Fire Protection Plans providing a complete overview of design life safety and building code compliance. Fire Protection Plan shall clearly identifying type of occupancy, type of construction, mixed uses if applicable, maximum distance of egress path permitted, and requirements for sprinklered facility. Fire Protection Plan shall indicate maximum occupancy of each space, path and distance of egress travel, locations and duration's of fire rated walls and/or partitions.

2. Final Design Drawings: Final design drawings will be prepared from the approved concept designs. When standard design drawings are used, additional sheets will be incorporated as appropriate. Final design drawings together with a complete design analysis, construction specifications, and a cost estimate covering all architectural, technical, and engineering details will constitute construction contracting documents. Contract documents shall be developed sufficiently to provide for fair and competitive bids from contractors and suppliers, as well as to perform construction of the project without additional drawings, except for shop drawings or as may be required to deal with unforeseen conditions encountered during construction.

## IV. DESIGN SUBMITTALS - FORMAT AND DEFINITIONS:

A. Baltimore Districts' additional requirements for architectural and Interior Design submittals are explained in greater detail as follows:

1. PRE-CONCEPT DESIGN SUBMITTALS: Schematic design submittal shall include enough information to illustrate design criteria and constraints (users' requirements, site conditions, etc.) and proposed schematic design(s) (usually three design schemes) to satisfy the given criteria and design constraints.

a. DESIGN ANALYSIS: A narrative description of facility to include purpose, function and capacities in sufficient detail to characterize functional design features of the facility.

1. Background Data - Statement.

2. Synopsis of design directives.

3. Site description.

4. Architectural features of site and area where the facility is to be located, coordinated with the Installation Design Guide for the particular post.

5. Using service functional requirements.

6. Criteria source and reference for:

a. Functional areas and their relationships.

b. Space allocations.

c. Energy conservation.

d. Noise control.

7. Building Code and Life Safety analysis indicating type of occupancy, mixed uses, type of construction, allowable square footage and life safety compliance.

8. Building organization analysis of drawings. Discus provisions for future expansion, if applicable.

9. Discussion of schematic floor plans. Describe each plan including advantages and disadvantages of each.

10. Exterior Treatment Schemes: Describe architectural treatments for the exterior stating the intended design image and how it is to be achieved, and its relationship to surrounding structures. The exterior treatment must comply with the installation design guide for the particular post.

b. PRE-CONCEPT DRAWINGS: Schemes shall be developed and presented with the following drawing requirements.

1. Floor Plans: Each of the schemes shall have a floor plan drawn to scale. Drawing scale for metric projects to be no less than 1:100 (Projects with approved metric wavier - SAE scales at 1/8″= 1′-0″ or 1/16″= 1′-0″ as required.) Show major dimensions, window and door openings and room names.

2. Elevations: Include at least one representative elevation for each scheme. Show height between finished floors as well as overall building height, fenestration, and materials. More than one elevation may be required when building is sited on steep terrain.

3. Cross Sections: Show cross sections where needed to show differing floor-to-ceiling heights or other design features that are not readily discernible from the floor plans or elevations.

4. Area Study: Bubble Diagrams showing relationship of each scheme to site and surrounding buildings. Apply use of perspective sketches or elevations. The massing and proposed architectural treatment should be clear for each scheme.

2. CONCEPT DESIGN SUBMITTALS: Concept design submittal shall contain necessary information to represent the overall size and character of the project. Generally this represents 30% of the total project.

a. Specification outline: A list of appropriate COE Guide Specifications together with a brief narrative covering the application of each specification to the particular project.

b. Concept Design Analysis: Provide schematic design analysis for facility that was selected and update as needed. Explain how all design features were integrated into the design. The following should be used as a checklist for a minimum submittal.

1. Background Data - Statement.

2. Brief synopsis of design directives.

3. Customers service and functional requirements.

4. General site description including architectural features of area where facility is to be located.

5. Architectural Design Solution: In narrative form the designer should state reasons for solution proposed, choice of specific materials, architectural treatment, and brief statement on other solutions considered but rejected, with reasons therefor. Refer to drawings if needed.

6. Technical Design Discussion Outlining Building Code Compliance: Fire Protection and Life Safety Requirements. The number of exits shall be based on AEI manual, Chapter 9, Fire Protection Criteria, and the National Fire Protection Association Pamphlet No. 101, Life Safety Code. Define type of occupancy, mixed uses if applicable, construction type, and structural system selected. The requirements for the various types of occupancy shall be covered, including all basic criteria used to arrive at these requirements.

7. Describe exterior design outlining type of roofing, walls, fenestration, doors and any special design

features (sunshades, porches, entry, dock, canopies, wing walls, etc.).

8. Discuss design implementation of the following features:

a. Functional areas and their relationships.

b. Interior Design and space planning requirements.

c. Energy Conservation: Narrative should explain a Multidisciplinary analysis of the climatic data and siting policy relative to the building form, orientation, fenestration, and material selection.

d. Acoustical controls with exterior site and interior building sound attenuation.

e. Features serving physically handicapped demonstrating compliance with Americans with Disabilities Act.

9. Calculations for:

a. Net room areas and gross building areas (indicate circulation, mechanical and electrical space).

b. Gross "U" values for each building(s).

c. Ratio of exterior wall to window area.

10. Security Provisions: Include requirements.

11. Building construction analysis including Life Cycle Cost (LCC), alternative materials including consideration of various construction systems and justifications for materials and systems selection.

12. Operational characteristics related to provisions for efficient utilization and maintenance of the facility.

13. Miscellaneous or unusual features, such as special hardware, computer floors, sound control, clean-rooms, elevators, draft curtains, etc.

14. Describe aspects special to constructibility including availability of materials, labor and

skills, local construction practices, local weather and site conditions, and items requiring long-lead times.

c. Concept Drawings (30%):

1. Floor Plans: Each of the schemes shall have a floor plan drawn to scale. Drawing scale for metric projects to be no less than 1:100, (projects with approved metric wavier - SAE scale at 1/8″= 1′-0″). Drawings shall be dimensioned, showing major architectural features such as windows, doors, columns, and toilet facilities and ADA compliance. Furniture and equipment layouts to assure spatial and circulatory adequacy.

2. Elevations: Showing heights, fenestration, and surface materials.

3. Building Cross Sections: Showing relation of space and structure.

4. Typical Wall Sections: Show at least one typical wall section for each construction type. A section through a bearing wall as well as through a non-bearing wall as a minimum.

5. Finish schedule tabulated with room numbers - indicate materials & finishes intended for floors, base, wainscot, walls, doors, ceiling and ceiling heights.

6. Roof Plan: Show drainage and roof slope(s).

7. Building organization with Interior Design and space planning solutions. Analysis including spatial organization and relationship principles, space layout sketches presented sequentially with sufficient narrative to indicate the reasoning and justification for major layout decisions. Provisions for future expansion, if applicable, shall be indicated. Include furniture layouts, sketches and finish schedules in sufficient detail to show coordination with architectural design. Discuss special requirements for partitions, equipment, hardware, etc.

8. Fire Protection Plans providing a complete overview of design life safety and building code compliance. Fire Protection Plan shall clearly identifying type of occupancy, type of construction, mixed uses if applicable, maximum distance of egress path permitted, and requirements for sprinklered facility. Fire Protection Plan shall clearly indicate maximum occupancy of each space, path and distance of egress travel, locations and duration’s of fire rated walls and/or partitions. Plans shall further indicate the following:

a. Emergency fire exits

b. Emergency lights

c. Fire extinguisher locations

d. Pull station locations

e. Bell or klaxon locations

f. Rated walls/partitions

g. Travel distances to the closest exits measured along the center line of the natural path of travel, starting from the most remote point of subject occupancy. To be is shown graphically by a line and arrow, and with a numerical travel distance indicated.

h. Indications of details to be incorporated.

3. PRELIMINARY DESIGN SUBMITTALS: When required, a preliminary design submittal shall represent the overall size and character of the project. Primarily needed for update of the construction cost estimate. This is due to the refinement of building systems. Generally this represents 65% of the total project.

a. Specification Outline: A list of appropriate COE Guide Specifications together with a brief narrative covering the application of each specification to a particular project.

b. Preliminary Design Analysis: Edit schematic design analysis for facility that was selected and update as needed. Explain how all design features were integrated into the design. The following should be used as a checklist for a minimum submittal.

1. Background Data: Statement.

2. Synopsis of design directives.

3. Customer's service and functional requirements.

4. General site description including architectural features of area where facility is to be located.

5. Architectural Design Solution: In narrative form the designer should state reasons for solution proposed, choice of specific materials, architectural treatment, and brief statement on other solutions considered but rejected, with reasons therefor. Refer to drawings if needed.

6. Technical design discussion outlining building code compliance. Fire Protection and Life Safety Requirements. The number of exits shall be based on Chapter 9, Fire Protection Criteria, AEI manual and the National Fire Protection Association Pamphlet No. 101, Life Safety Code. Define

type of occupancy, mixed uses if applicable, construction type, and structural system selected. The requirements for the various types of occupancy shall be covered, including all basic criteria used to arrive at these requirements.

7. Describe exterior design outlining type of roofing, walls, fenestration, doors and any special design features (sunshades, porches, entry, dock, canopies, wing walls, etc.).

8. Discuss design implementation of the following features:

a. Functional areas and their relationships.

b. Interior Design and space planning requirements.

c. Energy Conservation: Narrative should explain a Multidisciplinary analysis of the climatic data and siting policy relative to the building form, orientation, fenestration, and material selection.

d. Acoustical controls with exterior site and interior building sound attenuation.

e. Features serving physically handicapped demonstrating compliance with Americans with Disabilities Act.

f. Occupational safety and health.

g. Project signage provided in a signage schedule and coordinated with room numbers and safety markings as necessary for the project.

h. Logistic Responsibility: Equipment which is Contractor furnished and installed, government furnished and installed, etc. material and/or equipment. Discus logistic coordination as necessary.

i. Furniture and furnishings.

9. Complete calculations for:

a. Net room areas and gross building areas (indicate circulation, mechanical and electrical space).

b. Gross "U" values for each building(s).

c. Ratio of exterior wall to window area.

10. Security Provisions: Include requirements.

11. Building construction analysis including Life Cycle Cost (LCC), alternative materials including consideration of various construction systems and justifications for materials and systems selection.

12. Operational characteristics related to provisions for efficient utilization and maintenance of the facility.

13. Miscellaneous or unusual features, such as special hardware, computer floors, sound control, clean-rooms, elevators, draft curtains, etc.

14. Describe aspects special to constructibility including availability of materials, labor and skills, local construction practices, local weather and site conditions, and items requiring long lead times.

c. Preliminary Drawings: All drawings must be at a scale legible on half-size drawings.

1. Floor Plans: All floor plans drawn to scale. Drawing scale for metric projects to be no less than 1:100, (projects with approved metric wavier - SAE scale 1/8″=1′-0″). Drawings shall be dimensioned, showing major architectural features such as windows, doors, columns, and toilet facilities. Furniture and equipment layouts showing spatial and circulatory adequacy. Each room shall be assigned a separate number clearly indicated on the plans. Room numbers shall be as nearly consecutive as possible, beginning with the principal entry and progressing counter-clockwise through the plan. Spaces added by revision should be given the number of the primary or nearest room followed by a letter distinguishing it as a new area.

2. All Building Elevations: Accurately showing heights, fenestration, and building materials.

3. Building Cross Sections: All sections necessary to show relation of space and structure.

4. Typical Wall Sections: Show wall sections for each construction type. A section through a bearing wall as well as through a non-bearing wall as a minimum.

5. Finish schedule tabulated with room numbers -indicate materials, finishes, and colors intended for floors, base, wainscot, walls, doors, ceiling and ceiling heights.

6. Roof Plan: Show drainage and roof slope(s), size downspouts.

7. Indications of details to be incorporated.

8. Fire Protection Plans providing a complete overview of design life safety and building code compliance. Fire Protection Plan shall clearly identifying type of occupancy, type of construction, mixed uses if applicable, maximum distance of egress path permitted, and requirements for sprinklered facility. Fire Protection Plan shall indicate allowable occupancy of each space, path and distance of egress travel, locations and duration's of fire rated walls and/or partitions. Plans shall further indicate the following:

a. Emergency fire exits.

b. Emergency lights.

c. Fire extinguisher locations.

d. Pull station locations.

e. Bell or klaxon locations.

f. Rated walls/partitions.

g. Travel distances to the closest exits measured along the center line of the natural path of travel, starting from the most remote point of subject occupancy. To be is shown graphically by a line and arrow, and with a numerical travel distance indicated.

4. FINAL DESIGN SUBMITTALS: Final design submittal - Design work shall be completed with all construction documents (drawings & specifications), and Design Analysis complete for final submittal. This submittal represents 95% of the design effort with the remaining 5% used to ensure the design documents are complete and ready to advertise.

a. Marked-up COE Guide Specifications: All specifications required for the project shall be submitted with all changes from the original specification clearly shown. The specifications will not be final typed until all documents have been approved.

b. Final Design Analysis: It is important that all information pertaining to the design be recorded for future reference. The following should be used as a checklist for a minimum submittal.

1. Background Data: Statement.

2. Synopsis of design directives.

3. Customers service and functional requirements.

4. General site description including architectural features of area where facility is to be located.

5. Architectural Design Solution: In narrative form the designer should state reasons for solution proposed, choice of specific materials, architectural treatment, and brief statement on other solutions considered but rejected, with reasons therefor. Refer to drawings if needed.

6. Technical design discussion outlining building code compliance. Fire Protection and Life Safety Requirements. The number of exits shall be based on AEI manual, Chapter 9, Fire Protection Criteria, and the National Fire Protection Association Pamphlet No. 101, Life Safety Code. Define type of occupancy, mixed uses if applicable, construction type, and structural system selected. The requirements for the various types of occupancy shall be covered, including all basic criteria used to arrive at these requirements.

7. Describe exterior design outlining type of roofing, walls, fenestration, doors and any special design features (sunshades, porches, entry, dock, canopies, wing walls, etc.).

8. Discuss design implementation of the following features:

a. Functional areas and their relationships.

b. Interior Design and space planning requirements.

c. Energy Conservation: Narrative should explain a Multidisciplinary analysis of the climatic data and siting policy relative to the building form, orientation, fenestration, and material selection.

d. Acoustical controls with exterior site and interior building sound attenuation.

e. Features serving physically handicapped demonstrating compliance with Americans with Disabilities Act.

f. Occupational safety and health.

g. Project signage provided in a signage schedule and coordinated with room numbers and safety markings as necessary for the project.

h. Logistic Responsibility: Contractor furnished and installed, government furnished and installed, etc. material and/or equipment.

i. Furniture and furnishings.

9. Complete calculations for:

a. Net room areas and gross building areas (indicate circulation, mechanical and electrical space).

b. Gross "U" values for each building(s).

c. Ratio of exterior wall to window area.

10. Security Provisions: Include requirements.

11. Building construction analysis including Life Cycle Cost (LCC), alternative materials including consideration of various construction systems and justifications for materials and systems selection.

12. Operational characteristics related to provisions for efficient utilization and maintenance of the facility.

13. Miscellaneous or unusual features, such as special hardware, computer floors, sound control, clean-rooms, elevators, draft curtains, etc.

14. Describe aspects special to constructibility including availability of materials, labor and skills, local construction practices, local weather and site conditions, and items requiring long lead times.

c. Final Drawings:

1. Floor Plans: All floor plans drawn to scale. Drawing scale for metric projects to be no less than 1:100, (projects with approved metric wavier - SAE scale 1/8″=1’-0″). Drawings shall be dimensioned, showing major architectural features such as windows, doors, columns, and toilet facilities. Furniture and equipment layouts showing spatial and circulatory adequacy. Each room shall be assigned a separate number clearly indicated on the plans. Room numbers shall be as nearly consecutive as possible, beginning with the principal entry and progressing counter-clockwise through the plan. Spaces added by revision should be given the number of the primary or nearest room followed by a letter distinguishing it as a new area.

2. All Building Elevations: Accurately showing heights, fenestration, and building materials.

3. Building Cross Sections: All sections necessary to show relation of space and structure.

4. Typical Wall Sections: Show wall sections for each construction type. A section through a bearing wall as well as through a non-bearing wall as a minimum.

5. Finish schedule tabulated with room numbers -indicate materials, finishes, and colors intended for floors, base, wainscot, walls, doors, ceiling and ceiling heights.

6. Roof Plan: Show drainage and roof slope(s), size downspouts.

7. Indications of details to be incorporated.

8. Fire Protection Plans providing a complete overview of design life safety and building code compliance. Fire Protection Plan shall clearly identifying type of occupancy, type of construction, mixed uses if applicable, maximum distance of egress path permitted, and requirements for sprinklered facility. Fire Protection Plan shall indicate allowable occupancy of each space, path and distance of egress travel, locations and duration’s of fire rated walls and/or partitions. Plans shall further indicate the following:

a. Emergency fire exits.

b. Emergency lights.

c. Fire extinguisher locations.

d. Pull station locations.

e. Bell or klaxon locations.

f. Rated walls/partitions.

g. Travel distances to the closest exits measured along the center line of the natural path of travel, starting from the most remote point of subject occupancy. To be is shown graphically by a line and arrow, and with a numerical travel distance indicated.

5. BACKCHECK DESIGN SUBMITTAL: A final backcheck shall be a re-submission of all final submission documents. All documents shall be finalized with all previous review comments incorporated. Construction documents, drawings & specifications, shall be completed and ready for final printing of bid documents.

APPENDIX A

1. Architectural Scales: The following are the preferred scales for architectural drawings:

a. Definitive designs;

| Drawing | Metric Units | SAE Units | Notes: |
|---|---|---|---|
| Floor Plans | 1:100 | 1/8″=1′-0″ | |
| Elevations | 1:100 | 1/8″=1′-0″ | |
| Building Sections | 1:100 | 1/8″=1′-0″ | |

b. Project drawings and drawings for standard designs

| Drawing | Metric Units | SAE Units | Notes: |
|---|---|---|---|
| Floor Plans | 1:200<br>1:100<br>1:50 | 1/16″=1′-0″<br>1/8″=1′-0″<br>1/4″=1′-0″ | |
| Roof Plans | 1:200<br>1:100<br>1:50 | 1/16″=1′-0″<br>1/8″=1′-0″<br>1/4″=1′-0″ | Scale to match plan |
| Elevations | 1:200<br>1:100<br>1:50 | 1/16″=1′-0″<br>1/8″=1′-0″<br>1/4″=1′-0″ | |
| Toilet Plans | 1:50 | 1/4″=1′-0″ | |
| Interior Elevations | 1:100<br>1:50 | 1/8″=1′-0″<br>1/4″=1′-0″ | |
| Wall Sections | 1:20 | 3/4″=1′-0″ | |
| Stair Details | 1:10 | 1 1/2″=1′-0″ | |
| Details | 1:20<br>1:10<br>1:1 | 1 1/2″=1′-0″<br>3/4″=1′-0″<br>Full | |
| Building Sections | 1:100 | 1/16″=1′-0″<br>1/8″=1′-0″<br>1/4″=1′-0″ | Scale to match Elevations |
| | | | |
| | | | |

1) Graphic scales will appear on all drawings immediately to the left of the title block at the bottom of the sheet.

C. Metric scales are required unless a wavier is approved. Where the metric system is mandated the following scales are preferred:

1. Nine scales are preferred: 1:1 (full size), 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500 and 1:1000. Three others have limited usage: 1:2, 1:25, 1:250.

2. Metric drawing scales are expressed in non-dimensional ratios. Comparable ratios to SAE units are as follows:

| Drawing | Ratios | Preferred Metric Scales | Other: |
|---|---|---|---|
| Full size | 1:1 | 1:1 | 1:1 |
| Half size | 1:2 | 1:2 | 1:2 |
| 4″ = 1′-0″<br>3″ = 1′-0″ | 1:3<br>1:4 | 1:5 | |
| 2″ = 1′-0″<br>1 1/2″ = 1′-0″<br>1″ = 1′-0″ | 1:6<br>1:8 | 1:10 | |
| 3/4″ = 1′-0″<br>1/2″ = 1′-0″ | 1:16<br>1:20 | 1:20 | 1:25 |
| 3/8″ = 1′-0″<br>1/4″ = 1′-0″ | 1:32<br>1:24 | 1:50 | |
| 3/16″ = 1′-0″ | 1:60 | 1:50 | |
| 1/16″ = 1′-0″ | 1:196 | 1:200 | |
| 1″ = 20′-0″ | 1:240 | 1:250 | |
| 1″ = 30′-0″ | 1:360 | 1:500 | |
| 1/16″ = 1′-0″ | 1:384 | 1:500 | |
| 1″ = 40′-0″ | 1:480 | 1:500 | |
| 1″ = 50′-0″ | 1:600 | 1:1000 | |
| 1″ = 60′-0″ | 1:720 | 1:1000 | |
| 1″ = 80′-0″ | 1:960 | 1:1000 | |
| | | | |
| | | | |
| | | | |

2. Metric Units Used on Drawings. Dimension unit numbers always indicate millimeters and shall always be whole numbers; any decimal numbers taken to three places always indicate meters. Where modules are used, the recommended basic module is 100 mm which is similar to the 4-inch module used in building construction (4 inches = 101.6 mm).

APPENDIX B

1. Army and Air Force Publications. The following list is provided for guidance on what Army and Air Force publications are available with information pertaining to architectural design for the Corps of Engineers. This is a partial list only. Check with the Project Manager for a complete list.

| TITLE | NUMBER | DATE |
|---|---|---|
| Cost Estimates Military Construction | TM 5-800-2 | Jun 85 |
| Historic Preservation Maintenance Procedures | TM 5-801-2 | Feb 77 |
| Installation Master Planning | TM 5-803-1 | Jun 86 |
| Environmental Protection Planning in the Noise Environment | TM 5-803-2<br>AFM 19-10<br>NAVFAC P-970 | Jun 78 |
| Planning of Army Facilities | TM 5-803-4 | Jul 83 |
| Installation Design | TM 5-803-5<br>AFM 88-43<br>NAVFAC P-960 | Mar 81 |
| Planning and Design of Outdoor Sports Facilities | TM 5-803-10<br>AFR 88-33 | Apr 88 |
| Children's Outdoor Play Areas | TM 5-803-11<br>NAVY P-383<br>AFM 88-30 | Apr 88 |
| Planning of Outdoor Recreation Areas | TM 5-803-12 | Sep 86 |
| Landscape Design and Planting | TM 5-803-13<br>AFM 126-8 | Aug 88 |
| Site Planning and Design | TM 803-14 | Oct 94 |
| Noise and Vibration Control | TM 5-805-4<br>AFM 32-1090 | May 95 |
| Joint Sealing for Buildings | TM 5-805-6 | Sep 94 |
| Builders Hardware | TM 5-805-8 | Jan 92 |
| X-ray Shielding | TM 5-805-12 | Jan 90 |
| Raised Floor Systems | TM 5-805-13 | Dec 90 |
| Roofing and Waterproofing | TM 5-805-14 | May 93 |
| Signage | TM 5-807-10 | Dec 93 |
| Structural Design Criteria Loads | TM 5-809-1<br>AFM 88-3, Ch-1 | May 92 |
| Masonry Structural Design for Buildings | TM 5-809-3<br>NAVFAC DM 2.9<br>AFM 88-3, Ch-3 | Oct 92 |
| Storage Depots | TM 5-840-2 | Oct 94 |
| Space Planning Guide for TDA Consolidated Maintenance Facilities | TM 5-841-2 | Dec 80 |
| Laundries and Dry Cleaning Plants | TM 5-842-2 | Jan 86 |
| Courier Station Design | Tm 5-844-1<br>AFM 88-21, Ch-1 | Jan 92 |